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DATA PROCESSING DIGEST

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General Information

MANAGEMENT AND CORPORATIONS 1985

Edited by Melvin Anshen and G. L. Bach
McGraw-Hill Book Co. 1960. $5.50

A symposium was held at the Carnegie Institute of Technology which proposed to examine the future of management in the light of present and anticipated technological progress. The corporation structure is examined in its relation with a democratic society and with the economics of world politics. The effect of electronic data processing and control upon the corporate structure and upon management as we now know it is discussed; and education and moral responsibilities of the business world are pondered over.

In the chapter titled "The Corporation: Will It Be Managed by Machines?" by Herbert A. Simon, it is suggested that the fear that machines may eventually take over man's work does not take into account the factor of cost. That is, the traditional economic situation exists--"as technology changes and machines become more productive, the prices of labor and capital will so adjust themselves as to clear the market of both. As much of each will be employed as offers itself at the market price, and the market price will be proportional to the marginal productivity of that factor." For example, "if computers are a hundred times faster than executives in making investment decisions, but only ten times faster in handling employee grievances....then computers will be employed in making investment decisions, while executives will be employed in handling grievances."

It is foreseen that the clerical department and the factory will resemble each other increasingly. "The interrelation of man with machine will become quite as important a design problem...as the interrelation of man with man." Fewer employees in the office and factory will mean fewer per unit of output and per unit of capital equipment, not fewer in total.

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Office and factory will become more alike

It is not necessarily true that the higher-status occupations, and those requiring most education, are going to be the least automated. "There are perhaps as good prospects technically and economically for automating completely the job of a physician, a corporate vice-president, or a college teacher, as for automating the job of the man who operates a piece of earth-moving equipment." The writer predicts "that 'work-pushing' and 'expediting' will make up a much smaller part of the supervisory job at lower and middle levels in highly automated operations than they generally do at present." In general, "a larger fraction of members than at present will be engaged in occupations where 'personal service' involving face-to-tace human interaction is an important part of the job."

Computers will be able to "learn" problem-solving

In the automated management area, decision-making is now seen to have two aspects: programed, represented by the field of operations research or management science, and unprogramed (as well as programed), represented by the field of heuristic programing. The misconception that computers behave like morons is based on the lack of understanding of the possibilities. Computers can be programed to behave adaptively and to improve their own programs on the basis of their experiences--that is, to learn. It is now being discovered that computers can be programed to solve relatively ill-structured problems by using methods similar to human problem-solving. It is predicted that in ten years or less "we will be able technically to produce computers that can grapple with and solve at least the range of problems that humans are able to grapple with and solve--those that are ill-structured as well as those that are well-structured."

The conclusions of the writer are "that we will have the technical capability, by 1985, to manage corporations by machine; but that humans, in 1985, will probably be engaged in roughly the same array of occupations as they are now. I find both of these predictions reassuring.

"Acquiring the technical capacity to automate production as fully as we wish, or as we find economical, means that our per capita capacity to produce will continue to increase far beyond the point where any lurking justification will remain for poverty or deprivation. We will have the means to rule out scarcity as mankind's first problem and to attend to other problems that are more serious."

The fact that occupations will remain the familiar ones dismisses two fears: the fear of technological unemployment, and the fear of fraternizing with robots. This will leave us better prepared to attend to three fundamental problems: "developing a science of man, finding alternatives for work and production as basic goals for society, and reformulating man's view of his place in the universe."

BUSINESS NEEDS AN INTELLIGENCE DIRECTOR

Marion Harper, Jr., Interpublic, Inc., New York
MANAGEMENT AND BUSINESS AUTOMATION, March 1961; pages 20-23, 47

Information specialist

A good manager has concern for the future growth and success of the business or institution in his charge. What is needed is the development of a new profession to provide management with an intelligence service for the shaping of strategy and policy. Such a person would be called "Director of Intelligence Services." He would develop information for alternative recommendations and outline the probable consequences of moving in any direction. Some reasons for such a position:

1. Management decision-making is becoming an increasingly complex proglem.

2. "Informed decision" is a relative term; there are many different kinds of decisions, involving different proportions of information.

3. The supply of information is increasing by geometric progression. The most successful decision-makers will be those who can best process, interpret and put facts to use.

4. Management needs "protection" from the specialist whose view is often limited and one-sided.

5. Too many people take part in decisions, and there is too much reliance on obsolete information that goes under the name of experience.

University course is needed

"There is no advanced school today which offers a specific curriculum for the development of an intelligence executive. What is needed is a professional school very much like a law school, medical school, or engineering school, which could launch young men and women on a highly rewarding career... which could place them at the exciting nerve centers of business and bring them into the highest counsels of management." Such a school could "give students at least a working familiarity with business operations and the basic knowledge required for planning and executing a broad-gauge research program. It would indoctrinate young men and women in the business of problem-solving through the management of information."

The curriculum should include survey techniques, statistics, econometrics, projective psychological research, theory and practice of experimentation, operations research, computing machine techniques, analysis of administrative data, library techniques, and the design and management of research.

NOW YOU CAN AUTOMATE SHOP PAPERWORK

FACTORY, February 1961; pages 90-95

Shop reporting equipment uses three kinds of data input: a worker identification (often his identification card or badge); a punched card that contains information about the job being done; and a third card which identifies the machine or work code. The worker enters these cards into the recorder, sets dials or punches keys to enter the amount of pieces he produced. Usually the equipment automatically enters the time and date. The information is transmitted by cables to a central unit where it is punched into paper tape or tab cards.

Less paper and clerical work and more efficiency and management control can result from using shop reporting equipment. For example, the Norair Division of Northrop Corp. Collectadata system "cut shop reporting costs by 70%, and eliminated 12 reports altogether." However, the systems are not foolproof and care must be used in selecting equipment, providing for maintenance, and training workmen to use them. Some systems are plagued by queuing problems at the reporting stations. However, one make allows the system to switch to input from other stations when one is tied up with a slow input. Six tips are given for planning and installing a shop reporting system. Reprints of the article are available from the publisher. ((Digested by permission of Factory, copyright by McGraw-Hill Publishing Co.))

DATA PROCESSING TODAY: PROBLEMS, PRACTICES, AND PAYOFF

TEXTILE WORLD, March 1961; pages 42-47

Textile companies are finding electronic data processing of tremendous help in solving management problems. They suggest it is wise to start with the area of greatest importance--for example, sales analysis and billing for a company with large retail marketing operation; or inventory control in firms which have their primary interest in industrial markets. Where new EDP systems have gone wrong it has been because of insufficient testing, poor systems design, or lack of executive interest in the project. Some tips are given on selecting equipment, cost of installation, employee turnover, service bureaus and interplant communications. The article concludes with case histories of the EDP systems installed by Dan River Mills, American Thread Co., Chicopee Manufacturing Corp., Chatham Manufacturing Co., Bruck Mills, Ltd., and Dominion Textile Co.

THE PERSONNEL PARADOX: PEOPLE SEEK JOBS WHILE JOBS SEEK PEOPLE

OFFICE MANAGEMENT AND AMERICAN BUSINESS, April 1961; pages 13-17

If business expansion is greater than increases in operating efficiency, total clerical employment figures will probably continue to rise. Computers do create jobs to replace the ones they eliminate, but the jobs created are very different in content, and the same people are not likely to be able to do them. It would seem wise to review present testing and selecting procedures to ensure a continuing source of persons qualified to step into positions in the EDP system as time goes on. Also tests should be devised to find those persons in the present organization who will be able to work with the EDP system even before the equipment is installed.

BANKING AUTOMATION AND THE MAGNETIC INK CHARACTER RECOGNITION PROGRAM

Dale L. Reistad, Booz, Allen and Hamilton
Detroit Research Institute, 1961. $7.50

An excellent understanding of the needs for automation in banking and the development of MICR to answer those needs is presented in this research report. Recommendations for making a feasibility study are included in the first chapter. The history of the MICR program is given, along with reasons for the need for bank automation and the problems involved in implementing a MICR program. Account numbering and suggestions for establishing an account numbering system are given. Control codes suggested for both electronic and manual systems. A large portion of the report is concerned with an understanding of the functioning of a bank in the processing of bank documents, and of the way in which automation can facilitate the handling of these documents. Finally, the role of the computer in the MICR program is described, describing the way in which such a program may be introduced into a bank system. An appendix gives the lectures delivered at the National Conference on Banking Automation in the spring of 1960. Those persons not in the banking industry who want to know what is being done in banking automation will find this book of value. For information on obtaining a copy write to: Detroit Research Institute, 12 East Hancock, Detroit 1, Michigan.

ELECTRONIC DATA PROCESSING AND AUDITING

Felix Kaufman, Partner, Lybrand, Ross Bros. & Montgomery
Ronald Press, 1961. $8.00

Here is a book that ought to be in every EDP library. It is the first thorough analysis of the impact of EDP upon internal control and auditing practices that we have seen, and the author is well aware of sophisticated uses of EDP.

The first three chapters provide brief background material, including the nature of electronic data processing, and planning for EDP. Chapters 4 through 10 then provide the main message.

EDP demands a new outlook

"A prominent viewpoint in the early thinking concerning electronics and auditing was the proposition that any important changes would be limited to the influences of exceptional speed and extraordinary accuracy." Mechanization can supplant arithmetical controls (generally proof against predetermined totals), but cannot significantly affect organizational controls (in general, limiting responsibility by practical and effective separation of duties), according to this viewpoint. "But the viewpoint expressed in this book is that such an opinion arises from a misunderstanding of the capabilities of electronic data processing and does not properly recognize the significant effects of electronics."

To illustrate the significant impact of EDP on the organization, the author makes extended reference to a pamphlet published by the American Institute of Accountants (now the American Institute of Certified Public Accountants) in 1949, titled "Internal Control," wherein a series of charts associate accounting procedures with basic departmental activities. The charts cover payroll, sales, accounts receivable, cash receipts, purchases, and cash disbursements. The charts use a company's organization chart as the standard format, to show information flow and departmental responsibilities.

In the book, each AIA chart is reproduced and beside it is shown a chart of the same function performed within an integrated EDP system, as occurring in practice. In addition, the author ties in other related activities with each chart--such as labor distribution with payroll; sales analysis, credit, inventory control with sales and billing; etc.

The organization will change

The organizational impact of EDP is glaringly apparent from a comparison of the charts. Organizational responsibilities are largely limited to preparation of various types of inputs, in the operational system.

In addition, the author has analyzed the AIA charts to identify and classify the different types of internal control activities normally used. These include:

A. Measures based upon the consistency of information

1. Proof totals
   a. Example: ledgers are proved to controls
2. Review functions
   a. Example: Purchase orders are checked by requisitioner, including prices.

B. Measures based upon the "meaning" of information

1. Example: Discounts and other noncash credits are approved by the treasurer.

C. Measures based upon comparisons of source data

1. Example: Job time tickets are checked to clock cards used for payroll.

D. Measures based upon outside checks

1. Example: Duplicate deposit slips received directly from bank.

E. Organization of clerical work

1. Separation of duties
   a. Example: Make independent count of merchandise received.

After identifying and classifying all internal control procedures in the AIA charts, the author then analyzes each classification as to the effect of EDP on it.

Hardware affects controls

Related to this discussion of internal control functions, two chapters discuss some of the hardware and programing characteristics which have an effect on internal control. These characteristics include: parity checks, echo checks, programmed checks (consistency, validity, reasonableness, etc.), input file label checking, output file label checking and the most effective points for control totals, for controlling the transmission of information.

Some comments are made about on-line systems, and numerous comparisons are drawn with magnetic tape systems. For instance, on-line processing appears to eliminate the proof total environment, since a responsibility center no longer exists which batches to prove that it has fulfilled its data collection obligations. However, errors controlled by proof totals are minimized by on-line transmission.

"It seems fair to say that the ultimate goal in internal control is achieved when the control features are integrated so effectively into procedures that the acts which implement procedures also implement control. The vigilance is built in so that the system is self-disciplining." We think that the author has done an effective job in investigating the extent to which a self-controlling system can be constructed.

INFORMATION RETRIEVAL AS A CONTROLLERSHIP TOOL

David R. Dilley, U.S. Steel Corp., New York
THE CONTROLLER, April 1961; pages 174-176, 208

Specific applications of information retrieval to the accounting function might be:

1. Assembly and analysis of data obtained from published sources outside the firm.
2. Recall of information from specially prepared reports within the firm.
3. Recall of historical operating and accounting data.
4. Abstracting of articles and written reports for time-saving in reading.
5. Matching of user-interest profiles against incoming documents, to route information to interested persons.
6. Comparison of practices and organizations through literature by persons in other firms.
7. Planning and development of accounting personnel through analysis of background and experience.
8. Research on tax and legal questions.

GENERAL INFORMATION MANUAL INTRODUCTION TO IBM DATA PROCESSING SYSTEMS

The IBM Corporation has prepared a manual which covers in a basic and general fashion the structure and meaning of computers and computer logic. The way in which data is represented in computing systems; storage, processing, and input/output devices; programing; and checks and controls are all covered from the IBM equipment point of view. For information, contact your local IBM Computer representative.

SPECIAL ISSUE ON COMPUTERS

PROCEEDINGS OF THE IRE, January 1961

The entire January 1961 issue of the IRE Proceedings is devoted to computers. A random sampling of titles suggests the tone of the contents: "Steps Toward Artificial Intelligence," "Self-Organizing Systems--A Review and Commentary," "Advanced Computer Applications," "Computers in Automatic Control Systems," "European Electronic Data Processing--A Report on the Industry and the State-of-the-Art."

REAL TIME COMPUTING

AUTOMATIC DATA PROCESSING, March 1961; pages 18-21

Some of the best-known real-time systems are the Semi-automatic Ground Environment complex (SAGE), Strategic Air Command 465-L Command Control Computer, Project MASS inventory control system of the Signal Corps, and some of the industrial process control installations among public utilities, refineries, chemical manufacturers, and iron and steel makers. Real-time computing in commercial applications has been confined to uses such as airline passenger seat reservations, although real time systems are being planned for savings bank deposit accounting, also.

Flexibility is one of the advantages of a real-time system. A number of input and output and storage units may be placed as desired either at a central processor or at remote stations. Thus an integrated information system may be tailored made from shelf items. Systems may be designed modularly for centralized or decentralized organizations.

NEW SOLUTION FOR SOME COMMON PROBLEMS OF COMPUTER USERS

BURROUGHS CLEARING HOUSE, March 1961; page 12

Some user complaints about computing equipment are listed:

1. Communication between man and machine is complicated, making problem preparation too big a task.
2. Some of the system's components are idle much of the time.
3. Too much external manual control is required.
4. Expansion or alteration of the system necessitates costly reprograming.

Some answers to these problems found in the newer computers are:

1. New computers provide built-in ability to accept instructions in human language.

2. A master control program virtually eliminates human intervention.

3. Two or more programs may be run simultaneously.

4. Modular design allows the user to expand the system with programing.

The Burroughs Corporation believes its B-5000 to be the answer to such complaints.

Management Sciences

MANAGEMENT INTERNATIONAL

A new publication titled MANAGEMENT INTERNATIONAL has been created by a number of management science organizations in the Western world. The U.S. organization participating is The Institute of Management Sciences (TIMS). The publication is printed in four languages, English, French, German, and Italian, with each article appearing in at least three of the four in consecutive order. Contents deal with the problems and opportunities of management and the management sciences, and the publication provides a medium for the international exchange of information in this important field. MANAGEMENT INTERNATIONAL is published bi-monthly; subscription in the U.S. is $10; in Great Britain, £ 3.12, France, NF 50, Germany, DM 42, Italy, Lire 6200. Publisher is Betriebswirtschaftlicher Verlag Dr. Th. Gabler, Taunusstrasse 54, Wiesbaden, Germany. U.S. contact is Adolph E. Grunewald, Secretary-Treasurer Management International, Graduate School of Business Administration, Michigan State University, East Lansing, Michigan.

Systems Design

MANAGEMENT ALARM DIGITS

Richard S. Sloma, Cities Service Oil Co.
DATA PROCESSING (U.S.A.), March 1961; pages 9-13

It is suggested that the management reports produced by the EDP system be coded to implement management by exception. In this system, a set of standards is established which indicate by number values from 0 to 9 the degree of variance from pre-set standards on each report. These codes are then placed in the upper right hand corner of the page during the automatic printing process, and the executive's secretary can easily sort out those reports indicating a need for action to be placed on top of the pile for speedy executive action.

Applications

DATA PROCESSING FROM THE MERCHANTS' VIEWPOINT

J. D. Collister, Kistler-Collister, Albuquerque, N.M.
Retail Research Institute EDP Up-Dating Service

In designing an EDP system for Accounts Receivable, Kistler-Collister, retail store in Albuquerque, had three major requirements:

1. The customer must not be inconvenienced or delayed. Therefore, the account number was restricted to the machine room, and the customer was not required to carry an identification plate or card.

2, All practical forms were designed as punched cards--sales checks, charge advice, credit advice, credit memo, C. O. D. -lay-a-way sales check, statement and stub, and follow-up notice. Additional advantages to this which were not foreseen were: Entries do not have to be batched within record as in one-shot posting; each entry can be further written upon, mailed, added to, and enter itself automatically into the system upon its return.

3. Smooth information flow was achieved by having the punched card sales checks picked up at the sales stations at frequent intervals during the day. Nearly random-access processing was accomplished in this manner.

4. Individual sales books were eliminated. Any sales person could use sales forms at any of the selling stations.

EDP IN THE INTERNAL REVENUE SERVICE

SPACIFIC MONTHLY, March 1961; page 3

The Internal Revenue Service is establishing a nation-wide data processing system with an IBM 7070 located at a National Computer Center near Martisburg, West Virginia. The system will scan all tax returns, corporate and individual, by 1969. The Center "will transfer information from tax returns, withholding tax forms and other source documents to magnetic tape. The 7070 installation at the National Computer Center will process the magnetic tapes, make computations and comparisons, and return the results to the Service Centers for conversion to documents going to the taxpayers. Under the new system, the I. R. S. will be able to provide, for the first time, a consolidated permanent tax account for every taxpayer in the nation. All transactions for all taxes and tax periods will be cleared through this permanent record before presenting a net bill or refund."

AUTOMATION AND THE DEPARTMENT STORE

STORES, March 1961; pages 14-16

Arthur Andersen & Co. have developed an inventory management system for style merchandise which 1) signals the buyer automatically on styles which are selling faster or slower than the planned rate of sale; 2) calls for reorder if quantity on hand or on order is too small for the actual rate of sale, and suggests size or reorder and size and color distribution of reorder, or 3) calls for markdown if quantity is too large for sales rate and suggests size of markdown. The system is in pilot operation, using a RAMAC.

Equipment

OPTICAL RECOGNITION—THE BREAKTHROUGH IS HERE

DATAMATION, March 1961; pages 22-28

The American Standards Association Character Recognition Standards Subcommittee is attempting to define standards for printed characters that can be readable both by humans and data processing systems. The determination of such standards must consider the total system so that one part may not be overburdened. For example, type standards could be so loosely specified that every known printing device could achieve the standards, but the cost of a reliable reader would be impractically high. Likewise, extremely high standards in type, while making a low-price reader possible, would demand very precise and expensive printing mechanisms.

Applications areas have been expanded from the original two--retail and government--to finance, transportation, utilities, manufacturing, insurance, petroleum, and communications. Eight characteristics having to do with shape and coding restrictions have been established for the characters. At the present time, Farrington leads in the development and installation of optical scanning devices. However, other companies are active, including NCR and IBM. NCR's objective is to design optical scanners which can read the company's conventional cash register, accounting, and adding machine tapes. IBM has recently introduced its 1418 optical character reader, designed to be used with the 1401 computer, and use the computer's more complex logic to read directly from printed characters into the computer.

OPTICAL SCANNING SYSTEMS

AUTOMATIC DATA PROCESSING, March 1961; pages 33-38

Some optical scanners are described. Those using a bar-code method are the Sweda E-3 Character Reader, and the Addressograph 9500. In the bar-code type, the codes are machine readable only, and do not have shapes which are recognizable readily by humans. Character recognition devices, however, have codes which resemble familiar numbers and alphabetic characters, redesigned to provide optical scanning requirements. These include NCR Optical Scanner, the Solartron ERA, the Farrington Optical Scanning System. The IBM 1418 is an optical character reader which is an input feed for an IBM 1400 series computer, eliminating the need for the punch card operation.

FIRST ALPHA-NUMERIC PAGE READER DEVELOPED

ARMED FORCES MANAGEMENT, March 1961; page 46

Farrington Manufacturing Company, Needham Heights, Mass., has announced development of the first alpha-numerican transistorized commercial page reader. The Farrington Optical Scanner scans ordinary business documents and translates the information it reads into punched paper tape at the rate of 240 characters per second. Other Farrington machines will be able to read at 340 characters per second when magnetic tape, rather than punched paper tape, is used.

A MAJOR BREAK-THROUGH IN BANK OPERATIONS

UNITED STATES INVESTOR, February 20, 1961; pages 19, 20

Interest among banks in establishing central data processing service bureaus has been quickened by the introduction of the Univac 490 Real-Time System. In using this equipment for a savings bank operation, the teller inserts the customer's passbook into the Unisaver (the teller's keyboard and printer) at his desk. He indexes the account number and the amount of the transaction, which is immediately relayed to the central Real-Time Computer. The computer automatically checks for stops or holds and interest posting before computing the current transaction. The Real-Time Computer makes use of the new thin-film memory.

DATA COMMUNICATION

DATA PROCESSING (U.S.A.), February, 1961; pages 7-12

Brief descriptions of various leased wire systems are given. These range from the simple semi-automatic torn-tape arrangement designed for small data networks to large fully automatic switching networks linking many stations into one central computing operation. Some examples of costs are given, also. Under normal daytime conditions, costs are about 72 cents per circuit (airline) mile. Higher speed circuits are a better buy if they can be utilized.

COMPUTER CHARACTERISTICS QUARTERLY

The Computer Characteristics Chart published by Charles W. Adams Associates, Inc. last fall and reproduced in the October 1961 issue of DPD has been transformed into a quarterly updated service. The excellent chart has taken on a new form, also. It is now available in a very convenient thin pocket-sized plastic bound booklet, or as a set of six 8-1/2 x 11 sheets. Two new columns have been added: "Monthly Rental Range," and "Date First Delivery." The column headed "Input-Output Channels" has been dropped. Nine computer systems which were announced between August 1960 and January 1961 have been included in the most recent revision, bringing the total of computers in the list to 55. For such a valuable reference, the subscription price is very nominal: $5 per year for the quarterly issues. For information, write to Adams Associates, 142 The Great Road, Bedford, Mass.

THE RELIABILITY OF MECHANICAL ENGINEERING PARTS OF DATA PROCESSING SYSTEMS

THE COMPUTER BULLETIN, March 1961; pages 151-154

Mechanical failures are described as any failure due to faulty electrical or electronic design as well as purely mechanical failures. Some causes of mechanical failures are due to inadequacy of mechanical design to meet the exacting standards of the electronic aspects of the equipment, and lack of provision in the design for warning of impending failure. There is a lack of good actual designers in the mechanical field who can work with and understand the electronic designers. A solution to this problem appears to be the development of data processing engineers per se, who can envision the entire design problem, both mechanical and electronic

Points of Interest

FileSearch is an information storage-retrieval system developed by FMA, Inc. of El Segundo, California. The system stores 32,000 standard-sized magazine pages on a single reel of microfilm, and automatically searches the microfilm reels at the rate of 6400 pages a minute, making copies of the requested material. Price of the system is slightly over $100,000.

The Waterbury National Bank of Connecticut has leased computing equipment from Bendix Corporation to set up a commercial data processing service for the benefit of small businesses in the bank's vicinity which cannot afford their own computing systems. The Automated Accounting Center is a division of the bank, but the computer's service will be sold on a time and fee basis to any business in the state, and in pre-selected areas in bordering states.

Now available is an IBM 650 simulation program for the IBM 1410 which simplifies the programing transition from the 650 to the 1410. Reprograming of some 650 routines may now be deferred until after the installation of a 1410.

Hughes Aircraft Company has designed a "job shop simulation" to pre-test various management plans for production of communications equipment. The simulation provides for representation of a month's work on a 15-minute computer run.

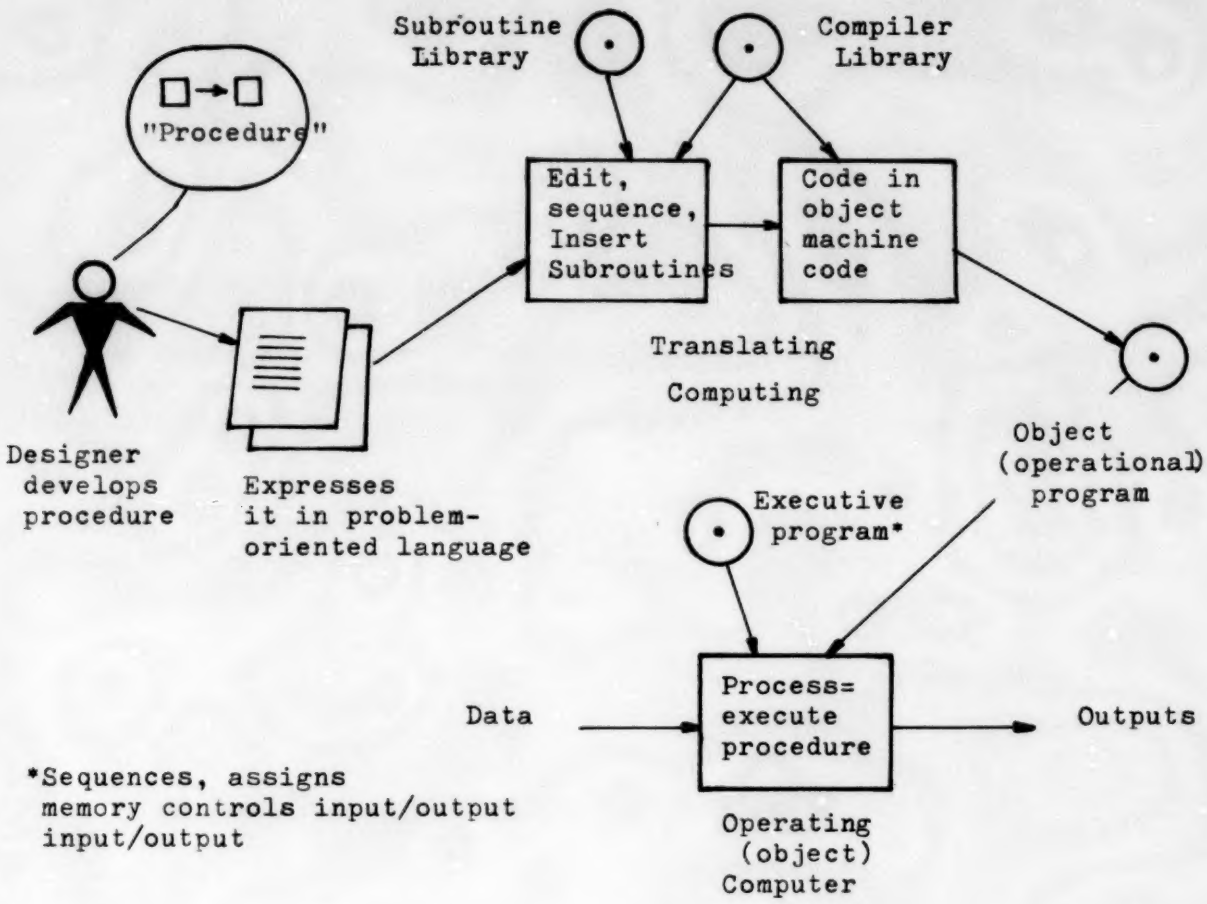
Comment

AUTOMATIC PROGRAMING TODAY—Part I

Problem-oriented language

Automatic programing has now come of age. Nearly all manufacturers provide, with their equipment, a compiler program which permits a user to do his programing in a "problem" oriented language and which translates this language to the machine's code. Many users define their procedures in one of these problem-oriented languages, eliminating some phases of the programing process. In fact, equipment manufacturers are now offering software--the programing system --as their major selling point. This Comment reviews the value of automatic program systems for the user and suggests some ways of measuring their true operational worth.

The sequence of steps required to prepare a program is shown in the figure.



From the point of view of the user who wants the procedure executed economically, the factors in this sequence which are important are the problem-oriented language and the time to execute the processes. These are discussed below.

The Problem-Oriented Language. The problem-oriented language should:

- help the procedure designer express the procedure easily
- eliminate procedural and clerical errors. Using languages which contain words and grammar familiar to the user helps eliminate clerical and logical errors which occur when the user tries to express the procedure in machine (object) codes.

Many problem-oriented languages have been developed, but two appear to be becoming standard. All manufacturers do or will provide compilers for them. (For a language to be useful, there must be available a compiler program--for some machine--to translate to the object program for the operational machine.) The two standard languages are:

ALGOL - for the expression of numerical procedures for solving mathematical and logical problems[1]

COBOL - for defining data processing procedures[2]

Is COBOL the last word?

A few manufacturers offer a language which combines both of these. ALGOL (with occasional improvements) will probably continue as the language expressing procedures for solving mathematically formulated problems--including some business decision-making procedures. There is more question as to whether COBOL is the final answer in the data processing field. The assumption in COBOL is that the designer will flow chart the procedure, and that the list of COBOL statements can then be easily devised from the flow chart. The latter is certainly true. The question is: Is flow-charting the best way for a designer to think of a procedure? There is some evidence that tabular arrays are a better way to design and communicate data handling procedure. COBOL would still be used to describe entries within the table.

Although still controversial, one manufacturer (G.E.) now offers a compiler called TABSOL* to translate from table arrays to machine language.[3] Tabular language compilers can probably be prepared quickly by other manufacturers, if the demand arises.

(Part II will discuss processing times and summarize the value of automatic programs.)

* G.E. registered name

SUGGESTED READING

1. Woodger, M., "An Introduction to ALGOL 60," The Computer Journal, Vol. 3, No. 2 (July 1960), pages 67-75

2. COBOL - Report to Conference on Data Systems Language, Dept. of Defense, April 1960, U.S. Gov't Printing Office, Supt. of Documents, Washington 25, D.C. (75¢)

3. Refer to Kavanaugh's article on TABSOL in December 1960 EJCC Proceedings. See also TABSOL Manual, General Electric, Computer Department, Phoenix, Arizona

4. "The Descriptor - A Definition of the B-5000," Information Processing System Bulletin 5000-20002-P, February 1961, Burroughs Corp., Detroit 32, Michigan

Training

Short Courses in Operations Research, presented by Case Institute of Technology

Date: June 5-16, 1961 — Course: Survey of Concepts, Methods & Problems
Course: Production and Inventory Control
June 19-30, 1961 — Course: Survey of Mathematical Techniques
Course: Mathematical Programming

Fee: $400 per two-week course
Information: Herbert B. Schultz, Jr., Manager, Special Programs, Case Institute of Technology, University Circle, Cleveland 6, Ohio

University of Michigan, College of Engineering Summer Conferences: courses are offered in operations research, management sciences, and advanced data processing. For information, write to R. E. Carroll, 126 West Engineering Building, University of Michigan, Ann Arbor, Michigan.

PERT/PEP Training Course, sponsored by Operations Research Incorporated

Date: June 5-9, 1961 — Place: Silver Spring, Maryland
July 10-14, 1961
Date: May 15-19, 1961 — Place: Santa Monica, California
June 26-30, 1961
July 24-28, 1961

Fee: $290 per person, including materials
Information: Operations Research Incorporated, 225 Santa Monica Blvd., Santa Monica, California

5th Annual UCLA Summer Executive Program

Date: June 11-30, 1961
Place: Lake Arrowhead, California (University of California Conference Center)
Fee: $650
Information: Dr. Fred E. Case, Graduate School of Business Administration, University of California, Los Angeles 24, California

Electronic Data Processing Seminar for Bankers, sponsored by NABAC, The Association for Bank Audit, Control and Operation

Date: June 12-15, 1961
Place: Chicago, Ill. (Sheraton Towers Hotel)
Information: NABAC, 38 S. Dearborn St., Chicago 3, Illinois

Industrial Engineering Seminars

Date: June 13-16, 1961
Place: Department of Industrial and Engineering Administration, Sibley School of Mechanical Engineering, Cornell University
For whom: Operating management personnel in line supervision and staff positions in industrial engineering, production engineering, engineering administration, operations research, research and development, quality control, production control, cost control, materials management, purchasing data processing, and the controller's function.
Information: J. W. Gavett, Seminars Coordinator, Department of Industrial and Engineering Administration, Upson Hall, Cornell University, Ithaca, New York

Seminars in Industrial Engineering

Date: June 13-16, 1961
Place: Cornell University
Information: J. W. Gavett, Upson Hall, Cornell University, Ithaca, New York

Systems and Procedures Course, sponsored by American Management Association

Date: Unit I: Sept. 11-15, 1961
Unit II: Oct. 9-13, 1961
Unit III: Nov. 27-Dec. 1, 1961
Place: AMA Academy, Saranac Lake, New York
Fee: $775 (AMA members: $675)
Information: Hollis Wyman, Course Director, AMA Academy, Sarnac Lake, New York

Engineering Executive Program, presented by University of California at Los Angeles

Date: Beginning September, 1961
Place: University of California at Los Angeles, California
Fee: $350 for each semester
Requirements: Applicants must meet the acceptance standards of the Graduate Division of UCLA, and must have at least 5 years full time industrial experience
Deadline: Applications must be submitted by March 1, 1961
The Engineering Executive Program, Dept. of Engineering, Room 4173C Engineering Bldg. Unit I, University of California, Los Angeles 24, California

Operations Research Development Program

Date: September 18, 1961 - January 26, 1962
Place: Case Institute of Technology
Fee: $1000
For whom: Intensive program at the graduate level for qualified scientists and engineers with industrial experience. Successful completion of the program is recognized by the award of a Certificate in Operations Research.
Information: Professor Russell L. Ackoff, Case Institute of Technology, University Circle, Cleveland 6, Ohio

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Managing Editor: Margaret Milligan

Meetings

Eighth Annual Symposium on Computers and Data Processing, sponsored by Denver Research Institute

Date: June 22, 23, 1961
Place: Estes Park, Colorado (Elkhorn Lodge)
Program: Invited and offered papers on Components and Devices, Logic Design, Philosophy of Computer Design, and Computers and Education
Information: For information about symposium and submission of papers write to: W. H. Eichelberger, Denver Research Institute, University of Denver, Denver 10, Colorado

NMAA National Conference

Date: June 28-30, 1961
Place: Toronto, Canada (Royal York Hotel)
Information: R. Calvin Elliott, Executive Director, National Machine Accountants Association, 1750 West Central Road, Mt. Prospect, Illinois

Annual Conference of Northwest Computing Association

Date: July 21, 22, 1961
Place: University of British Columbia, Vancouver, B. C.
Information: Conference Information, Northwest Computing Association, Box 836, Seahurst, Washington

8th Annual International Meeting of The Institute of Management Sciences

Date: August 23-26, 1961
Place: Brussels, Belgium (Palace of Congresses)
Information: TIMS, Box 273, Pleasantville, New York

Association for Computing Machinery National Conference

Date: September 5-8, 1961
Place: Los Angeles, California (Statler-Hilton Hotel)
Information: A. C. M. 1961 National Conference, Ben Handy, Litton Systems, 5500 Canoga Ave., Woodland Hills, Calif.

NABAC National Convention (The Association for Bank Audit, Control, and Operation)

Date: September 11-13, 1961
Place: Chicago, Illinois
Information: NABAC, 38 South Dearborn Street, Chicago 3, Illinois

International Systems Meeting

Date: October 8-11, 1961
Place: Cleveland, Ohio (Hotel Statler and Hotel Pick-Carter)
Program: "Systems Management in Transition"
Information: Systems and Procedures Association, 817 Penobscot Building, Detroit 26, Michigan

Computer Applications Symposium, sponsored by Armour Research Foundation

Date: October 24, 25, 1961
Place: Chicago, Illinois (Terrace Casino, Morrison Hotel)
Information: Robert B. Brausch, Armour Research Foundation, 10 West 35th Street, Chicago 16, Illinois

Institute on Electronics in Management, sponsored by The American University

Date: October 30--November 3, 1961
Place: The American University, Washington, D. C.
Information: Prof. Lowell H. Hattery, Director, Center for Technology and Administration, The American University, 1901 F Street, N. W., Washington 6, D. C.

TIMS-ORSA 2nd National Meeting

Date: November 8-11, 1961
Place: San Francisco, California (Jack Tar Hotel)
Information: The Institute of Management Sciences, Box 273, Pleasantville, N. Y.

1961 Eastern Joint Computer Conference

Date: December 12-14, 1961
Place: Washington, D. C. (Sheraton-Park Hotel)
Theme: Computers--Key to Total Systems Control
Papers: Papers are being sought in following general areas: Business Management Control, Military and Space Command Control Systems, Industrial Process Control, Real Time Systems, Network Control, Man-Machine Systems, Self Organizing Systems, High Speed Digital Data Communications. Submit papers to: Bruce G. Oldfield, IBM Federal Systems Division, 326 E. Montgomery Ave., Rockville, Md. before June 20, 1961.

References

DATA PROCESSING DIGEST does not provide copies of the original material digested or reviewed in this issue. The publishers' addresses are listed below for your convenience in writing to them for more complete information.

Armed Forces Management
1001 Vermont Ave. N. W.
Washington 5, D. C.

Automatic Data Processing
Mercury House
109-119 Waterloo Rd.
London SE 1, England

Burroughs Clearing House
2nd and Burroughs Ave.
Detroit 32, Michigan

The Computer Bulletin
Finsbury Ct. Finsbury Pave.
London EC 2, England

The Controller
Two Park Ave.
New York 16, New York

Data Processing
Gille Associates
22nd Fl, Book Tower
Detroit 26, Mich.

Datamation
10373 W. Pico Blvd.
Los Angeles 64, Calif.

Factory
330 W. 42nd St.
New York 36, New York

IRE (Inst. of Radio Engrs)
1 East 79th St.
New York, New York

Management & Business Automation
600 W. Jackson Blvd.
Chicago 6, Illinois

McGraw-Hill Book Co.
330 West 42nd St.
New York 36, New York

Office Management &
American Business
212 Fifth Ave.
New York 10, New York

Retail Research Institute
100 West 31st St.
New York 1, New York

SPAcific Monthly
Systems and Procedures
Association
219 W. 7th St., Suite 516
Los Angeles 14, California

Stores
100 West 31st St.
New York 1, New York

Textile World
330 West 42nd St.
New York 36, New York

United States Investor
286 Congress St.
Boston 10, Mass.